Tree Farm Licence 54

BRITISH COLUMBIA
MINISTRY OF FORESTS

Issued to International Forest Products Limited

Rationale for
allowable annual cut (AAC) determination

effective December 30, 1996

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Chief Forester

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Objective of this document

This document is intended to provide an accounting of the factors considered and the rationale employed in making my determination, under Section 7 of the *Forest Act*, of the allowable annual cut (AAC) for Tree Farm Licence (TFL) 54.

Description of the TFL

TFL 54, held by International Forest Products Limited (Interfor, 'the licensee'), is located on the west side of Vancouver Island and lies almost completely (93%) within the area covered by the provincial government's 1993 Clayoquot Sound Land Use Decision (CSLUD). Due to this location, and because the provincial government has accepted that the forests in the CSLUD area will be managed according to a series of recommendations made specifically for the Clayoquot Sound area by a scientific panel, the majority of the TFL is being managed in accordance with these recommendations. This special management has significant implications for a current assessment of the timber supply in the TFL for the present section 7 AAC determination, as discussed below, in the section "Guiding principles for AAC determinations for areas including portions of Clayoquot Sound". As also noted in that section, areas of the TFL outside Clayoquot Sound will be managed in accordance with the Forest Practices Code of British Columbia.

The total area of the TFL is 60 986 hectares, which includes 3651 hectares for Meares Island, although this area is not currently assumed to contribute timber supply (see below, *Meares Island*), and 11 951 hectares of newly protected areas, which, although not formally removed from the TFL, are also excluded from contributing to timber supply. The TFL area also includes approximately 122 hectares of schedule A private land. The total productive forest land base in the TFL (excluding all protected areas and Meares Island) covers 41 049 hectares, with a currently estimated conventionally operable timber harvesting land base of 23 877 hectares.

The TFL landscape is dominated by old-growth forests comprised primarily of western redcedar, western hemlock and amabilis fir. The TFL is located in the windward island mountains ecosection and includes parts of the coastal western hemlock and mountain hemlock biogeoclimatic zones.

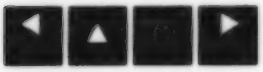
The TFL lies in close proximity to the communities of Tofino and Ucluelet, and the First Nations villages of Hot Springs Cove, Ahousaht, Opitsaht, Esowista and Port Albion.

Clayoquot Sound supports industries which include forestry, fishing, fish processing, mining, and tourism—particularly recreational activities associated with Pacific Rim National Park. In recent years, the integration of appropriate forms and levels of development with the natural values present in the Clayoquot area has aroused a high level of public debate and participation in comprehensive planning processes. This led to the 1993 CSLUD, and to the establishment of the Scientific Panel for Sustainable Forest Practices in Clayoquot Sound (the Scientific Panel) to define appropriate forest practices for the area, including the TFL. The CSLUD designated portions of the TFL for protected areas, special management areas and general integrated management areas.

Clayoquot Sound has an extensive First Nations cultural history, and the TFL includes traditional territories claimed by several First Nations represented by the Nuu-chah-nulth Tribal Council. Most of the TFL is covered by the Interim Measures Agreement of March 1994, extended in April 1996,

between the provincial government and hereditary chiefs of the Nuu-chah-nulth Central Region Tribes. This agreement established the joint First Nations-provincial Central Region Board to oversee development in the Clayoquot area, and the planning of operations on the TFL must now be reviewed and coordinated through this board.

The licensee manages operations in the TFL from Tofino, and the TFL is administered by the B.C. Forest Service (BCFS) from its Port Alberni Forest District Office in Port Alberni. Most of the wood harvested from the TFL is transported by barge to Vancouver for processing in company mills in the lower mainland. A recent agreement with the Toquaht First Nation has led to the establishment of a small sawmill near Ucluelet, utilizing low-grade cedar logs, although little wood from TFL 54 goes to this mill.



History of the AAC

Harvesting has occurred for several decades in the area of Clayoquot Sound now occupied by TFL 54. On May 18, 1955, the Maquinna Forest Management Licence (FML) No. 22 was awarded to British Columbia Forest Products Ltd. In July 1981 FML 22 was replaced with TFL 22, which was amalgamated in July 1983 with TFL 27 to create TFL 46, which in September 1988 was purchased by Fletcher Challenge Canada Ltd. On December 19, 1991, blocks 4 and 5 of TFL 46, the west coast portion, were split off to become TFL 54, which was transferred to Interfor on December 30, 1991.

The AAC set for Management Plan (MP) No. 1 for TFL 54 in 1991 was 180 000 cubic metres. In May, 1994, the Chief Forester determined temporary AAC reductions totalling 42 000 cubic metres for the TFL under Part 15 of the *Forest Act* as an interim measure to account for protected areas and anticipated changes to management resulting from the CSLUD. The resulting AAC of 138 000 cubic metres remains in effect today and includes 129 009 cubic metres for the licensee and 8991 cubic metres for the Small Business Forest Enterprise Program.

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New AAC determination

Effective December 30, 1996, the new AAC for TFL 54 will be 75 750 cubic metres. This represents a decrease of 58 percent from the AAC of 180 000 cubic metres that was in effect before the Clayoquot Sound Land use decision, or 45 percent from the current AAC of 138 000 cubic metres which includes the Part 15 reduction. This new AAC will remain in effect until a subsequent AAC is determined, which must take place within five years of this determination.

This AAC should not be construed as an input to local planning processes overseen by the Central region Board, which are intended to identify the specific areas for harvest on which the actual harvest level achieved will depend.

Having now determined a new AAC for TFL 54 under section 7 of the *Forest Act* which has excluded the designated protected areas and has accounted in a general way for new management practices in Clayoquot Sound, I have also made a new order, effective December 30, 1996, repealing the temporary AAC reduction previously ordered for TFL 54 under Part 15, related to Orders-in-Council Nos. 718 and 719.

Information sources used in the AAC determination

Information considered in determining the AAC for TFL 54 includes the following:

- Statement of Management Objectives, Options and Procedures (SMOOP) for draft MP No. 2 of TFL 54, submitted April 1994, accepted by BCFS, October, 1994;
- Existing stand yields, accepted by BCFS Resources Inventory Branch, December, 1995;
- Managed stand yields, accepted by BCFS Research Branch, January, 1995;
- Timber Supply Analysis Information Package (IP), submitted August 1994, by Timberline Forest Inventory Consultants on behalf of the licensee, accepted February 1995;
- Timber Supply Analysis Report for TFL 54, submitted May 1995, by Timberline Forest Inventory Consultants on behalf of the licensee, accepted December 1995;
- Draft Management Plan 2 (MP No. 2) for TFL 54, submitted March 14 1996;
- Summary of stakeholder responses to public involvement initiatives for TFL 54 MP No. 2;
- Technical review and evaluation of current operating conditions through comprehensive discussions with BCFS staff, notably at a meeting held in Victoria on November 27, 1996;
- Correspondence and communication with the licensee and with Timberline Forest Inventory Consultants on matters related to this determination;
- *Vancouver Island Land Use Plan*, Province of BC, June 1994;
- *Completing the Protected Area System on Vancouver Island*, Protected Areas Boundary Team, October 1994;
- *Special Features Protected Areas Summary Report,* Land Use Coordination Office, February 1996;
- *Clayoquot Sound Land Use Decision — Key Elements*, Province of British Columbia, April 1993;

• *Sustainable Ecosystem Management in Clayoquot Sound, Planning and Practices*, Scientific Panel for Sustainable Forest Practices in Clayoquot Sound, April 1995;

• Meeting with Clayoquot Sound Central Region Board, June 19, 1996;

• BCFS presentation to Clayoquot Sound Central Region Board, September 16, 1996;

• Letter from Clayoquot Sound Central Region Board to Chief Forester, October 1, 1996;

• Letter from the Minister of Forests, July 28, 1994, to the chief forester, stating the Crown's economic and social objectives (Appendix 3);

• Memorandum from the Minister of Forests, February 26, 1996, to the chief forester, stating the Crown's economic and social objectives regarding visual resources (Appendix 4);

• Letter from the Minister of Forests, September 17, 1996, to the chief forester, stating the Crown's economic and social objectives regarding Clayoquot Sound (Appendix 5);

• Memo from John Cuthbert, May 27, 1994, to Rick Slaco, R.P.F, Interfor, re temporary AAC reductions for TFL 54 under section 170 of the *Forest Act*;

• *Forest Practices Code of British Columbia Act*, July 1995;

• *Forest Practices Code of British Columbia Regulations*, April 1995.

Role and limitations of the technical information used

Section 7 of the *Forest Act* requires me as chief forester to consider biophysical as well as social and economic information in AAC determinations. A timber supply analysis, and the inventory and growth and yield data used as inputs to the analysis, typically form the major body of technical information used in AAC determinations. Timber supply analyses and associated inventory information are concerned primarily with biophysical factors — such as rate of timber growth and definition of the land base considered available for timber harvesting — and with management practices. Timber supply analyses also indirectly incorporate some economic information such as operability classifications that define the types of terrain and timber that can be physically and economically accessed given current technology and markets.

However, the analytical techniques used to assess timber supply are simplifications of the real world. There is uncertainty about many of the factors used as inputs to timber supply analysis due in part to variation in physical, biological and social conditions—although ongoing science-based improvements in the understanding of ecological dynamics will help reduce some of this uncertainty.

Furthermore, technical analytical methods such as computer models cannot incorporate all of the social, cultural, and economic factors that are relevant when making forest management decisions. Therefore, technical information and analysis do not necessarily provide the complete solution to forest management problems such as AAC determination. The information does, however, provide valuable insight into potential impacts of different resource-use assumptions and actions, and thus forms an important component of the information I consider in AAC determinations.

In making the AAC determination for TFL 54, I have been provided with the licensee's timber supply analysis based on an information package gathered using methodology typical of that used in analyses for most AAC determinations. In using this information I have considered known limitations of the technical information provided. I have also been provided with a BCFS timber supply analysis based on my interpretation of certain of the Clayoquot Sound Scientific Panel's recommendations. I am satisfied that, subject to the specific uncertainties and cautions identified throughout this document, the information provided forms a suitable basis for determining a harvest level in accordance with this interpretation.

Statutory framework

Section 7 of the *Forest Act* requires the chief forester to "determine an allowable annual cut before December 31, 1996, and after that determination at least once every five years after the date of the last determination, for...each timber supply area and...each tree farm licence area". Section 7 also requires the chief forester to consider particular factors in determining AACs for timber supply areas and tree farm licences. Section 7 is reproduced in full as Appendix 1.

Guiding principles for conventional AAC determinations under section 7 of the *Forest Act*

Rapid changes in social values and in our understanding and management of complex forest ecosystems mean that there is always some uncertainty in the information used in AAC determinations. Two important ways of dealing with uncertainty are:

> (i) minimizing risk, in respect of which, in making AAC determinations, I consider the uncertainty associated with the information before me, and attempt to assess the various potential current and future social, economic and environmental risks associated with a range of possible AACs; and
>
> (ii) redetermining AACs frequently, to ensure they incorporate up-to-date information and knowledge — a principle that has been recognized in the legislated requirement to redetermine AACs every five years. The adoption of this principle is central to many of the guiding principles that follow.

In considering the various factors that Section 7 of the *Forest Act* requires me to take into account in determining AACs, I attempt to reflect as closely as possible operability and forest management factors that are a reasonable extrapolation from current practices. It is not appropriate to base my decision on unsupported speculation with respect either to factors that could work to increase the timber supply—such as optimistic assumptions about harvesting in unconventional areas, or using unconventional technology, that are not substantiated by demonstrated performance—or to factors that could work to reduce the timber supply, such as integrated resource management objectives beyond those articulated in current planning guidelines or the Forest Practices Code. However, in the unique case of Clayoquot Sound, in consideration of a specific expression by the Minister of Forests of the Crown's social and economic objectives for the area, I have assessed the timber supply based both on the Forest Practices Code and on my interpretation of specific, and more stringent, recommendations of the Scientific Panel for Sustainable Forest Practices in Clayoquot Sound.

The impact on timber supply of the Forest Practices Code and, for TFL 54, the Scientific Panel's recommendations, is a matter of considerable public concern. In determinations made before the Code was brought into force, no final standards or regulations were available at the time the timber supply analyses were conducted. Accordingly, the analyses were unable to assess the impacts of any new constraints on timber production which might be imposed under the Code. In those determinations I did not consider any more stringent restrictions or additional impacts upon timber supply beyond those anticipated to occur due to the application of guidelines current at the time of determination. However, I assumed that the Code would at least entrench the standards exemplified by those guidelines as statutory requirements.

The *Forest Practices Code of British Columbia Regulations* were approved by the Lieutenant Governor in Council on April 12, 1995, and released to the public at that time. The *Forest Practices Code of British Columbia Act* was brought into force on June 15, 1995. Studies in selected timber supply areas (TSAs) (see *Forest Practices Code Timber Supply Analysis*, BCFS, and BC Environment, February 1996) indicate that under the Code there will be some impacts on timber supply additional to those expected under previous guidelines. In AAC determinations made since the coming into force of the Code, I have viewed with some caution the timber supply projections in timber supply analyses that pre-date the Code, or that are based on information packages that largely pre-date the Code, as is the case in TFL 54. At the same time, I am mindful that the full force of the Code may not be felt during the transition phase of its implementation, and the impacts of specific factors on timber supply may not yet have been assessed on a local basis. Again, in the case of TFL 54, I have also considered my interpretation of certain aspects of the more stringent management regime recommended by the Scientific Panel.

The impact on the timber supply of land-use decisions resulting from planning processes such as the Commission on Resources and Environment (C.O.R.E.) process or the Land and Resource Management Planning (LRMP) process is a matter often raised in discussions of AAC determinations. In determining AACs it would be inappropriate for me to attempt to speculate on the impacts on timber supply that will result from land-use decisions that have not yet been taken by government. Thus I do not consider the possible impacts of existing or anticipated recommendations made by such planning processes, nor do I attempt to anticipate any action the government could take in response to such recommendations.

Moreover, even where government has made land-use decisions, it may not always be possible to analyze the full timber supply impact in AAC determinations. In most cases, government's land-use decision must be followed by detailed implementation decisions. For example, a land-use decision may require the establishment of resource management zones and resource management objectives and strategies for these zones. Until such implementation decisions are made, it is impossible to properly assess the overall impact of the land-use decision. Where specific protected areas have been designated by legislation or by order in council, these areas are no longer considered to contribute to timber supply. The legislated requirement for five-year AAC reviews will ensure that future determinations address ongoing plan implementation decisions. In the case of TFL 54, I have accounted for known implications of the provincial government's Clayoquot Sound Land Use Decision and, in view of the social and economic objectives of the Crown as expressed for the Clayoquot Sound area by the Minister of Forests, I have also accounted as fully as is technically possible at this time for an estimate of the implications of certain of the subsequent recommendations of the Scientific Panel.

The Forest Renewal Plan will fund a number of intensive silviculture activities in the province that have the potential to affect timber supply, particularly in the long term. In general, it is too early for me to assess the consequences of these activities, but wherever feasible I will take their effects into account. The next AAC determination will be better positioned to determine how the Plan may affect timber supply.

Some have suggested that, given the large uncertainties present with respect to much of the data in AAC determinations, any adjustments in AAC should wait until better data are available. I agree that some data are not complete, but this will always be true where information is constantly evolving and management issues are changing. Moreover, in the past, waiting for improved data has created the extensive delays that have resulted in the current urgency to redetermine many outdated AACs. In any case, the data and models available today are superior to those available in the past, and will undoubtedly provide for more reliable determinations.

Others have suggested that, in view of data uncertainties, I should immediately reduce some AACs in

the interests of caution. However, any AAC determination I make must be the result of applying my judgement to the available information, taking any uncertainties into account. Given the large impacts that AAC determinations can have on communities, no responsible AAC determination can be made solely on the basis of a response to uncertainty. Nevertheless, in making my determination, I may need to make allowances for risks that arise because of uncertainty.

With respect to First Nations issues, I am aware of the Crown's legal obligations resulting from the June 1993 Delgamuukw decision of the B.C. Court of Appeal regarding aboriginal rights. The AAC I determine should not in any way be construed as limiting the Crown's obligation under the Delgamuukw decision, and in this respect it should be noted that my determination does not prescribe a particular plan of harvesting activity within the TFL. Aboriginal rights will be taken into account as far as possible under Section 7(3) of the *Forest Act* and will be respected in the administration of the AAC determined. In the special case of Clayoquot Sound, it is expected that First Nations' concerns will be taken into account in the local planning and management of Crown forest lands by the participation of First Nations on the Central Region Board.

Regarding future treaty decisions, as with other land-use decisions it would be inappropriate for me to attempt to speculate on the impacts on timber supply that will result from decisions that have not yet been taken by government.

Overall, in making AAC determinations, I am mindful of my obligation as steward of the forest land of British Columbia, of the mandate of the Ministry of Forests as set out in Section 4 of the *Ministry of Forests Act*, and of my responsibilities under the *Forest Practices Code of British Columbia Act*.

Guiding principles for AAC determinations for areas including portions of Clayoquot Sound

As noted above, in "Description of the TFL", a major consideration in determining an appropriate AAC for TFL 54 is the inclusion of most of the TFL in the area now covered by the provincial government of British Columbia's CSLUD of April 1993.

Clayoquot Sound is a complex of mountains, valleys, ocean inlets, lakes, rivers, islands and forests, and in recent years plans to integrate resource use with conservation of natural values in the area have attracted international attention. At the World Conservation Congress in Montreal in October, 1996, the World Conservation Union (IUCN) passed a resolution supporting the designation of Clayoquot Sound as an International Biosphere Reserve (IBR) under the 'Man and the Biosphere' program of the United Nations Educational Scientific and Cultural Organization (UNESCO). The provincial government has expressed conditional support for this designation, noting that many of the land-use and management components already established for Clayoquot Sound also satisfy the requirements of a UN IBR designation. At this time it is not possible to assess whether the IBR status will be confirmed, but it appears likely that such a designation would include full recognition of the innovative forest management practices currently planned for the area. These currently planned practices have been derived under the following circumstances.

After many years of public participation and consultation regarding land and resource use planning in the area, the government's 1993 CSLUD assigned particular areas of the sound to three land-use categories — protected areas, special management areas, and general integrated management areas. Details of these areas as defined by the CSLUD are documented elsewhere, as for instance in *Clayoquot Sound Land Use Decision — Key Elements*, April 1993, Province of British Columbia.

On October 22, 1993, with the objective of defining world-class, sustainable forest practices for the area, the provincial government announced the formation of the Scientific Panel for Sustainable Forest Practices in Clayoquot Sound (the Panel).

In the interim before any of the Panel's findings could become available, to account in a general way for the estimated impact of the CSLUD on the timber supply in TFL 54, in May 1994 the chief forester determined a temporary AAC reduction for TFL 54 of 42 000 cubic metres under Part 15 of the *Forest Act*, as noted above in "History of the AAC". The rescindment date for the orders in council related to this Part 15 temporary reduction was set at January 1, 1998.

The signing in March 1994 of the Interim Measures Agreement between the provincial government and hereditary chiefs of the Nuu-chah-nulth Central Region Tribes led to establishment of the Clayoquot Sound Central Region Board (the Board) as part of a joint management process between First Nations and provincial government appointees, to oversee development in Clayoquot sound, including

implementation of the CSLUD. In April 1996, continuation of the Board in this role was formalized in the signing of the Clayoquot Sound Interim Measures Extension Agreement, which replaced the March 1994 agreement.

On May 30, 1995, the Panel submitted to government a three-volume report containing more than 120 recommendations on forest practices and First Nations issues. On July 6, 1995, the provincial government issued a joint news release between the Ministry of Forests and the Ministry of Environment, Lands and Parks, announcing acceptance of the Panel's report and government's intention to fully implement the report's recommendations.

In a letter to me as chief forester dated September 17, 1996 (see Appendix 5), the Minister of Forests, recognizing the unique and complex history of forest management in the Clayoquot area, expressed as an economic and social objective of the Crown a confirmation of government's intention that timber harvesting continue to be a forest management objective for the Clayoquot area and that this management be carried out in accordance with the Forest Practices Code and the recommendations of the Panel.

In considering my approach to the AAC determination for TFL 54 (which will also apply to TFL 44 and the Arrowsmith timber supply area, since these also include land within the CSLUD) I have noted the Panel's recommendation R7.1 in *Report 5* (pp. 153 and 246), which reads:

> "Adopt an ecosystem approach to planning, in which the primary planning objective is to sustain the productivity and natural diversity of the Clayoquot Sound region. The flow of forest products must be determined in a manner consistent with objectives for ecosystem sustainability. This entails abandoning the specification of AAC as an input to local planning."

and recommendation R7.10 (page 247), which reads:

> "Recognize that the rate (percentage of area cut per unit time) and geographical distribution of timber harvesting are more important determinants than is the volume removed when wood harvest is planned. *After* analysis of resources and development of area-based plans, determine the anticipated annual volumes of timber to be cut for watershed planning units."

The July 6, 1995 government news release includes the following response:

> "harvesting levels will be based on watershed planning, rather than on a predetermined annual allowable cut".

With respect to the Panel's recommendation for "abandoning the specification of AACs as an input to local planning", in British Columbia wherever possible AACs are already intended to be outcomes of, rather than inputs to, local planning. Nevertheless, this recommendation has been interpreted by some to mean that no AAC at all should be determined for areas managed according to the Panel's recommendations. However, recommendations R7.1 and R7.10 do contemplate determining a flow of timber products and anticipated annual volumes of timber to be cut for watershed planning units, *after* the analysis of resources and development of area-based plans.

I understand these recommendations to mean that the flow of timber or rate of harvest should be ecosystem based and I agree that it will be much easier to determine the appropriate rate after more resource information is gathered and watershed-level planning is complete. In this respect, over time the

AAC will become a reflection of the planning process. However, while I acknowledge and respect the Scientific Panel's report and the ongoing implementation of the recommendations, in British Columbia AACs are statutorily required for all TFLs and TSAs. In particular, as noted above in "Statutory framework" I am required by section 7 of the *Forest Act* to complete the AAC determination for TFL 54 before December 31, 1996.

Moreover, in determining the AAC for TFL 54 I am required by section 7 to consider the timber supply from the whole land base, including the appropriate areas of Clayoquot Sound (excluding protected areas). Thus my current AAC determination must include assessment of a harvest level for the entire TFL, including the major portion which lies within Clayoquot Sound.

However, as discussed further below, the harvest level determined is not a substitute for local planning in Clayoquot Sound, but is instead established as a maximum level of harvesting activity to help provide confirmation of sustainability for harvesting in the TFL. The timing and placement of the harvest will be subject to detailed watershed plans which are yet to be developed, as well as to the implementation of numerous other recommendations by the Panel as overseen by the Central Region Board.

In view of my obligation to consider the contribution to the timber supply from the Clayoquot area in determining AACs for TFLs 44 and 54, and the Arrowsmith TSA, in view of the Panel's recommendation identified above, and in view of the Central Region Board's ongoing work in implementing the CSLUD and the Panel's recommendations, I and my staff discussed this situation in detail with the Board. My aim in this was to investigate how the legal requirement for AAC determinations for the TSA and TFLs, including establishing harvest levels for areas in Clayoquot Sound, could best be reconciled with the Board's work. It is my intention in my determinations to acknowledge and respect the CSLUD and the Panel's recommendations without prejudice to future management implementation decisions by the Board.

Following discussions with the Board I have identified a means of estimating the timber supply that may reasonably be expected to result from my interpretation of certain of the Panel's recommendations, in order to satisfy my obligations under section 7 to determine the necessary AACs. It is acknowledged that the method used does not model the results of fully implementing the Panel's recommendations — which would clearly not be possible at this time — but does provide figures which I believe more closely represent the outcome of forest management in Clayoquot Sound than would a regular timber supply analysis that did not attempt to take the Panel's recommendations into account.

During the discussion, the Board was concerned that even if I could find a reasonable means for determining an anticipated level of timber harvesting in Clayoquot Sound, such a level should not become a target on which to base forest planning or management in the Clayoquot area. I would therefore like to clarify that in establishing allowable harvest levels in the Clayoquot area it is my intent that the levels determined should be viewed as upper limits, and I recognize that the *actual* harvest levels attained on the ground are expected to continue to be defined through appropriate planning and consultation, as recommended by the Panel and implemented by the Board. As with all AACs, I do not expect the harvest level determined by me for this TFL to be used as an *input* to planning. To this end, as noted below in "Implementation of decision", I have instructed the licensee and BCFS district staff to continue to work closely with the Board to ensure that within the AAC I have determined, all timber harvesting in the Clayoquot area is a result of, and conforms to, appropriate local planning and forest practices as recommended by the Panel.

In assessing the timber supply capability of the Clayoquot area, I note that the extensive recommendations in the Panel's report represent a complex and significantly different approach to forest management for the area. At this time many details remain uncertain regarding the interpretation in

operational activities of the forest management principles underlying the Panel's recommendations. While the full implications for timber supply in the area are therefore also uncertain and difficult or impossible to predict by conventional modelling, it is nevertheless possible to arrive at a reasonable *calculated estimate* of the available timber supply based on my generalized interpretation of certain of the Panel's recommendations.

There are two recommendations by the Panel which I have found most relevant to such an assessment. The first is R3.1 (page 81-82 and 237 of *Report 5*), which specifies that in any watershed larger than 500 ha in total area, the area cut in a five-year period should be limited to no more than 5 percent of the watershed area, and that for primary watersheds of 200 to 500 ha in total area, the area cut should be limited to no more than 10 percent of the watershed area within a 10-year period. Page 62 of *Report 5* discusses a one-percent watershed-based rate of cut as follows:

> "A watershed-based rate-of-cut of 1 % per year, while not unequivocally supported by data, appears to meet the needs of ecosystem management with regard to hydrology, habitat, and long-term sustainable wood supply. The rate of 1% per year appears appropriate as derived from hydrological considerations above, but also incorporates concerns about temporal distribution of seral stages for biological diversity and temporal distribution of wood supply for socioeconomic stability. The rate is consistent with the ecological desirability of ensuring harvested areas support a range of seral stages with a variety of different-aged forest habitats for wildlife, plants, and other organisms. It also is consistent with principles of sustainable ecosystem management where the intent is to provide a level of harvestable products that can be sustained over the long term (the sustainable long-term timber supply will be lower than historical annual cut levels in Clayoquot Sound)."

The second recommendation, noted at pp 63 and 170-171 of *Report 5*, specifies that at least 40 percent of the forest in a watershed-level planning unit (i.e. all reserves plus forest retained in harvestable areas) should be in age classes 8 and 9 (i.e. over 141 years of age).

Taking these recommendations and the other considerations specified in R3.1 into account, it is possible to establish an estimate of the annually harvestable area in the Clayoquot Sound portion of TFL 54, based on the assumption of limiting the harvest to one percent per year of the area while ensuring maintenance of at least 40 percent of the forest in each watershed at greater than 141 years. By assuming an average volume of timber per hectare, the annually harvestable area so derived may then be converted into an annually harvestable volume of timber. Since most of the TFL (93 percent) lies within the CSLUD, the licensee has agreed to accept the use of this method to determine timber supply for the whole TFL, although those parts of the TFL lying outside the CSLUD will be managed to meet the requirements of the Forest Practices Code, rather than the recommendations of the Panel.

The appropriateness of using my assumptions regarding the Panel's recommendations as a guide in this determination was discussed with the Central Region Board. With the acknowledgement that this approach does not model the results of fully implementing the Panel's recommendations, and with the reservation noted above concerning the use of harvest levels in planning, the Board has advised me that they believe these assumptions will provide a more reasonable basis for my assessment of the timber supply in the Clayoquot area than would a conventional timber supply analysis that did not take into account the Panel's recommendations.

Application of the Scientific Panel's recommendations in timber supply analysis

The Scientific Panel's recommendation R3.1 referred to in the previous section could be interpreted in several ways, i.e. as permitting the harvesting of one percent of: (a) the total area; (b) the productive forest area, or (c) the timber harvesting land base; totalled by watershed.

Two factors have been persuasive in my decision to adopt the timber harvesting land base, rather than the productive forest or the entire gross land base in each watershed, as a basis for calculating the harvestable area.

First, the timber harvesting land base is the only alternative that takes into account some of the historic environmental and economic limitations on harvesting. While it is not possible to account for all of the Panel's recommendations at this time I am aware that many of the recommendations will result in significant limitations on the amount of timber that can be harvested in any year. In particular the traditional timber harvesting land base will likely be smaller than that assumed under previous management guidelines. Thus, while the Panel recommendations on the rate of cut by watershed appear to apply to the total area in the watershed I believe that the combined impacts of the many recommendations of the Panel will result in a much smaller harvest level than would be indicated by 1 percent of the total area.

Second, application of the rate of cut recommendations to either (a) or (b) would in fact lead to a harvest level higher than the current AAC for the TFL, which has not been met for a number of years. The harvest level would not only be higher than the current AAC, as explained below in "Reasons for decision", it would be higher than the timber supply projected by the licensee's conventional analysis for the same area but based on the management assumptions in place prior to the Panel's recommendations. I have considered this to be inconsistent with the principles underlying the Panel's recommendations, particularly in view of the Panel's statement (p.62 of *Report 5*) that "the sustainable long-term timber supply will be lower than historical annual cut levels in Clayoquot Sound".

In contrast, application of the one-percent-rate-of-cut recommendations to (c) the timber harvesting land base in each watershed results in a harvest level that avoids these inconsistencies with the Panels' recommendations.

I have therefore decided to use one percent of the timber harvesting land base in each watershed as a basis for assessing the timber supply for areas in Clayoquot Sound, and in this case, for the entire area of TFL 54. BCFS staff discussed the three interpretations with the Board, and the Board agreed with my view that the application of the one-percent limit to the timber harvesting land base best reflects the

overall intent of the Panel's recommendations.

This interpretation enables me, in my AAC determination for TFL 54, to include an assessment of a maximum harvest level which considers the CSLUD and the Panel's recommendations.

The conventional role of the base case in AAC determinations

In considering the factors required under Section 7 to be addressed in AAC determinations, I am assisted by timber supply forecasts provided to me through the work of the Timber Supply Review project for TSAs and, for TFLs, by the licensees.

For each AAC determination a timber supply analysis is carried out, using a data package of information from three categories: land base inventory, timber growth and yield, and management practices. Using this set of data, and a computer simulation model, timber supply forecasts are produced. These include sensitivity analyses of changes in various assumptions around a baseline option, normally referred to as the "base case" forecast, which forms the basis for comparison when assessing the effects of uncertainty on timber supply. This was carried out by the licensee for TFL 54, and this analysis and the information upon which it was based have been of considerable benefit in my determination, particularly in deriving the net operable timber harvesting land base in each watershed, and in providing an assessment, for purposes of comparison, of the timber supply under management prior to the Panel's recommendations. Of particular significance has been the licensee's analysis of the timber supply in the TFL exclusive of Meares Island and protected areas, which projected an initial harvest level of 154 700 cubic metres per year under management prior to the Panel's recommendations. I have referred to this result in my "Reasons for decision" and elsewhere in this document.

While these noted aspects of the licensee's information have been of great benefit, under the special circumstances of the Clayoquot Sound Land Use Decision, the licensee's actual timber supply analysis was replaced, for the purposes of the remainder of my considerations in this determination, by a BCFS area-based calculation based on the assumptions described in the previous section. In my determination I have utilized the BCFS area-based, watershed-level analysis as a "base case" against which to test assumptions, as with any base case applied conventionally (as described in the following paragraphs) in a section 7 determination. In this case however, due to the specific nature of the analysis, none of the factors examined required significant adjustment to the timber supply projected in the analysis.

A base case forecast typically represents only one of a number of theoretical forecasts (as is the case in this TFL where an alternative land base could have been chosen as a basis for the analysis) and may incorporate information about which there is some uncertainty. Its validity—as with all the other forecasts provided — depends on the validity of the data and assumptions incorporated into the analysis used to generate it. Therefore, much of what typically follows in the considerations outlined in rationale statements for conventional AAC determinations under section 7, is an examination of the degree to which all the assumptions made in generating the base case forecast are realistic and current, and the degree to which its predictions of timber supply must be adjusted, if necessary, to more properly reflect the current situation. In this AAC determination for TFL 54, this principle has been applied in examining the assumptions in the area-based analysis.

Any indicated adjustments are made on the basis of informed judgement, using current information available about forest management, which — particularly during the period leading up to, and now during, the implementation of the Forest Practices Code — may well have changed since the original data package was assembled. In particular, as noted above, the base case for TFL 54 describes my interpretation of certain recommendations by the Scientific Panel for Sustainable Forest Practices in Clayoquot Sound.

Timber supply analysis

A timber supply analysis typical of most analyses provided in the Timber Supply Review process was prepared for TFL 54 by Timberline Forest Inventory Consultants and submitted in May 1995, almost concurrent with the April 1995 release of the Clayoquot Sound Scientific Panel's recommendations. While the assumptions in this conventional analysis were not consistent with the Panel's recommendations, the analysis formed a valuable basis for the subsequent area-based analysis carried out by the BCFS in an attempt to model the previously noted interpretation of the timber supply implications of the recommendations of the Scientific Panel.

To the extent possible, and as I have considered it appropriate, this area-based analysis has functioned in this determination as a "base case" harvest level against which to test certain assumptions about forest management. The methodology for applying the Scientific Panel's recommendations in the BCFS area-based analysis are described in the following section.

Timber supply analysis base case projection

As discussed above, in "Guiding principles for AAC determinations for areas including portions of Clayoquot Sound", the analysis which provided a basis for the assessment of timber supply in TFL 54 differed substantially from that which is conventionally employed in timber supply analyses in other areas of British Columbia, in that it was designed specifically for use with requirements interpreted from certain of the Panel's recommendations for Clayoquot Sound.

The base case analysis for TFL 54 was carried out as follows. First the total area of productive forest in the TFL was identified. Next, areas normally excluded from harvesting for reasons such as inoperability, environmental sensitivity and riparian reserves etc., were deducted from the productive forest, to derive the timber harvesting land base. A GIS-based overlay of the 302 watersheds in Clayoquot Sound was then superimposed on the TFL area, all 129 watersheds in the TFL were identified, the forested area in each watershed was assigned to ten-year age classes, based on stand age, and the area in the timber harvesting land base in each watershed was determined.

Based on my assumptions about the Panel's recommendations, a calculation was applied to the timber harvesting land base as follows. To ensure that old-growth forests cover 40 percent of each watershed at all times, any contribution required from the timber harvesting land base in addition to areas already excluded from harvesting for other reasons, was subtracted. (The 40-percent old-growth forest requirement was assumed to be satisfied by forest cover contributions from the total productive forest land base, rather than from the timber harvesting land base alone.) One percent of the remaining timber harvesting land base area was then calculated. To account for the influence of the last ten years of harvesting, it was assumed that the area less than ten years old was evenly distributed in ten one-year age classes. Thus ten percent of the area in the watershed with forest cover less than ten years old, was subtracted from the one percent area calculation. Based on the BCFS analysis, none of the watersheds in the TFL with less than 40 percent old growth actually contribute to the harvestable area derived for this AAC determination.

As also noted in "Guiding principles for AAC determinations for areas including portions of Clayoquot Sound", the licensee has agreed to accept the use of this method to determine timber supply for the whole TFL, although those parts of the TFL lying outside the CSLUD will be managed to meet the requirements of the Forest Practices Code, rather than the recommendations of the Panel.

The TFL area (excluding Meares Island and all protected areas) covers approximately 45 384 hectares. The current timber harvesting land base covers 23 877 hectares. Applying the one-percent-per-year harvestable area on a watershed basis, reduced by ten percent of the area in the watershed less than ten years old, in conjunction with the minimum 40-percent old-growth forest cover requirement — which was a limiting factor on timber supply in only 7 of the 129 watersheds in TFL 54 — results in a figure of approximately 125 hectares that could be harvested annually.

In order to convert this area figure into an annually harvestable volume, an area-weighted average figure for the volume of old-growth timber (over 140 years) per hectare on the harvestable area was obtained from average volume lines for all old-growth stands as discussed below in *volume estimates for existing stands*. The average harvestable volume so obtained is 606 cubic metres per hectare, which leads to an estimated annual allowable harvest volume for TFL 54 of 75 750 cubic metres.

Consideration of factors as required by Section 7 of the *Forest Act*

The *Forest Act*, Section 7 (3)

In determining an allowable annual cut under this section the chief forester, despite anything to the contrary in an agreement listed in section 10, shall consider

> **(a) the rate of timber production that may be sustained on the area, taking into account**
>
> **(i) the composition of the forest and its expected rate of growth on the area**

- Land base contributing to timber harvesting
  - - newly protected areas
  - - Meares Island
  - - non-productive and non-commercial forest
  - - economic and physical operability
  - - roads, trails and landings
  - - environmentally sensitive areas
  - - deciduous-leading forest types
  - - riparian areas

Land base contributing to timber harvesting

As part of the process used to define the timber harvesting land base—i.e., the land base estimated to be economically and biologically available for harvesting—a series of area deductions were made from the productive forest. These deductions took into account factors such as environmental sensitivity and the presence of deciduous stands and riparian areas, which may render an area undesirable to harvest for economic or ecological reasons. In reviewing this process I am aware that some areas may have more than one classification; e.g., environmentally sensitive areas may also lie in riparian areas. Hence, the figure shown for a given category in the netdown table in the timber supply analysis or mentioned in the AAC rationale does not necessarily reflect the total area with that classification; much of it may have been deducted earlier for other reasons.

The total area of the TFL, before excluding Meares Island and areas newly protected under the 1993 CSLUD, was 60 986 hectares. The current timber harvesting land base derived for the TFL is 23 877 hectares, after deductions in respect of factors noted in this section. The information package in which this estimate was derived was prepared prior to the proclamation of the Forest Practices Code and prior to the publication of the recommendations of the Scientific Panel. BCFS staff advise me that the respective reductions do in fact approximate what would now be required under the Forest Practices Code. Since the operational implications of many of the Panel's recommendations are not possible to anticipate in detail, I have assumed that any further provisions for biodiversity that may be required to meet the Panel's recommendations are accounted for by the one-percent, 40-percent and 10-year constraints as applied in the BCFS area-based timber supply analysis, as discussed in Integrated resource management objectives, below.

- newly protected areas

A total of 11 951 hectares in the TFL were protected in the 1993 CSLUD. In this AAC determination I have assumed no contribution to the timber supply from any protected area.

- Meares Island

Meares Island was not included in the provincial government's 1993 Clayoquot Sound Land Use decision. However, since 1985, Meares Island has been subject to a court injunction preventing all timber harvesting on the island. In 1994, the court action was adjourned indefinitely with the injunction in force.

My guiding principles for AAC determinations indicate that in the absence of any formal designation of protection such an area would usually be considered to contribute to timber supply. However, in view of the longevity of this injunction, in this AAC determination I have assumed no timber supply contribution from Meares Island in order to ensure that the continued avoidance of harvesting on the island will not result in an increased rate of harvesting anywhere else in the TFL.

For the purposes of this determination the exclusion of Meares Island results in a reduction of 3651 hectares to the TFL land base.

The TFL land base net of reductions for newly protected areas and Meares Island is 45 384 hectares, of which 41 049 hectares, or 90 percent, are productive forest.

- non-productive and non-commercial forest

A total of 4335 hectares were classified as non-productive forest, lakes, swamps, rock, alpine areas, etc., and were excluded from the timber harvesting land base, together with one hectare of non-commercial brush.

- economic and physical operability

Operability mapping, including both economic and physical operability, was completed for the TFL in 1992 and was accepted by Port Alberni Forest District in 1993. A total of 13 420 hectares, including low-productivity sites, were identified as inoperable.

The current timber harvesting land base of 23 877 hectares is comprised of approximately 75 percent conventionally operable, 14 percent marginally operable, 6 percent operable by helicopter, and 5 percent operable from shoreline. District staff accept these figures, noting some uncertainty regarding shoreline operability I accept the possibility that, as innovative forest practices are implemented throughout Clayoquot Sound consistent with the Panel's recommendations, an acceptable means for developing these areas can be found. Additional experience in implementing the Panel's recommendations is needed to clarify this issue, but for the purposes of this determination, I accept the current estimates of operability as a reasonable approximation of the total operable land base in the TFL.

- roads, trails and landings

An original estimate by the licensee of a deduction of 2 percent of the timber harvesting land base less than 60 years old for all existing roads, trails and landings was considered by district staff to underestimate the actual area removed from production. After consideration of the licensee's road deactivation program, and uncertainty introduced by the growth of larger crowns on trees adjacent to roads, the estimate was adjusted to 3 percent, or 208 hectares. No additional allowance was made for site degradation in view of the predominance of cable logging systems in the TFL. For future roads, a reduction of 3 percent was assumed to apply to each age class greater than age 60 the first time it is harvested.

While each of these figures is lower than the corresponding overall figure for the adjacent Arrowsmith

TSA, it is likely that the generally more restrictive practices in Clayoquot Sound will lead to lower net losses to roads within the CSLUD area, and I have therefore considered this estimate to be reasonable for use in this determination.

- *environmentally sensitive areas*

Mapping of environmentally sensitive areas (ESAs) to BCFS standards was completed and submitted to the BCFS in 1992. The maps were accepted in January 1995 by the Ministry of Environment, Lands and Parks, the Department of Fisheries and Oceans, and the BCFS. Operable forest area totalling approximately 3000 hectares were excluded for sensitive soils, recreation, wildlife and water quality (in addition to the provisions effected through inoperable exclusions). Since the ESA mapping has been accepted by the reviewing agencies, I consider these deductions to be appropriate for use in deriving the net land base for use in the BCFS area-based analysis for this AAC determination.

- *deciduous-leading forest types*

All remaining stands dominated by deciduous tree species — 78 hectares — were deducted in deriving the timber harvesting land base, and for mixed stands, the deciduous component is excluded from volume projection tables. District staff confirm the appropriateness of these measures since almost all deciduous volumes in the TFL occur in riparian and flood plain areas or on landslide tracks, where no harvesting is likely to take place. I am satisfied that the deductions for deciduous forest types are appropriately included in the derivation of the timber harvesting land base.

- *riparian areas*

A total of 267 hectares of stream buffer zones were excluded from the timber harvesting land base in addition to riparian areas already removed for environmental sensitivity and inoperability, in accordance with the Coastal Fish Forestry Guidelines (CFFG) then in effect. The CFFG were not as constraining as the Code, but I note that a further 228 hectares of riparian areas were identified in the inventory of Forest Ecosystem Networks (FENs) and were also excluded. It is likely that the hydroriparian reserves recommended by the Panel will be yet more constraining, and I acknowledge that the uncertainty in this factor will be resolved only through local planning. In assessing the validity of the estimate of the timber harvesting land base assumed for the BCFS area-based analysis, I have considered it reasonable to assume that any additional constraint required in this respect will be accounted for in the application of the Panel's one-percent-per-year-harvesting and 40-percent-retained-old-growth requirements as applied in the analysis.

- Existing forest inventory
  - - general comments
  - - volume estimates for existing stands

Existing forest inventory

- general comments

The most recent timber-volume inventory for TFL 54 commenced in 1967 and was completed in 1970. The inventory information was updated to June, 1996 for depletions resulting from harvesting, and to December, 1994 for forest growth. The updated harvested areas were incorporated by BCFS staff in the area-based analysis, for an accurate representation of the area in each watershed permitted to be 10 years old or less. It is likely that the two years of growth since 1994 have led to a slight overestimation, in the area-based analysis, of the area under ten years old in the timber harvesting land base, which could mean a slightly *larger* harvestable area than calculated (about 5 hectares per year). However, as noted below, under Not-satisfactorily-restocked area, the timber harvesting land base was also not adjusted to reflect current NSR, which would result in a slightly *smaller* harvestable area than calculated. These two factors are of approximately the same magnitude, and I have assumed no significant net effect on the analysis.

Approximately 74 percent of the forest in the timber harvesting land base has reached 140 years or more in age, with very little area currently between 60 and 140 years.

The first phase of a new vegetation inventory for the TFL is already underway, following completion of which the second phase will begin immediately.

- volume estimates for existing stands

In order to determine an allowable harvest level for the TFL, it is necessary to obtain an estimate of the average volume per hectare of harvestable timber in existing forest stands greater than 140 years old, and to multiply this average volume by the derived estimate of the total harvestable area in the TFL.

Average volumes in the TFL were calculated from plots established in existing old-growth forests over 140 years of age, based on utilization standards as noted below under Utilization and compliance.

Average volumes were calculated for each of 15 analysis units (defined below under ***site index estimates — aggregation***) and resulted in average volumes per hectare ranging from 268 cubic metres per hectare for cedar on poor growing sites to 1051 cubic meters per hectare for balsam on good sites. It was assumed that these average volumes would remain valid until harvesting.

From these results, an average volume per hectare for the whole TFL area was calculated by weighting each of the derived average volumes proportionally according to the total area supporting that average volume. This produced an average figure over the entire TFL area of 606 cubic meters per hectare. This figure agreed with the figure accepted for the TFL as a whole by the BCFS Resources Inventory Branch in December, 1995.

The licensee's field staff suggest that the yield estimates as used for this analysis are significantly lower than actual harvested volumes. However, it is not clear whether the licensee's experience is representative of the entire strata used to produce the average volume, or if this simply reflects the experience to date in operating at a point in stand types which may not be representative of the entire TFL. No supporting documentation has been provided. Therefore, and considering also the possibility that some of the more productive areas may have been historically selected out of the TFL for inclusion in the timber licences, I have considered the average volume derived for the TFL to be within a reasonable range and suitable for use in this determination.

- Expected rate of growth
  - - site index estimates — aggregation
  - - volume estimates for regenerated stands
  - - minimum harvestable ages
  - - species profile of harvest

Expected rate of growth

- site index estimates — aggregation

Site indexes, determined from the ages and heights of trees, are used to estimate the productivity (growth potential) of tree-growing sites. The original Fletcher Challenge forest inventory file includes site indexes based on 5-metre site index classes. These classes were used in the BCFS area-based analysis as a basis for grouping species and site categories in assigning a series of analysis units over which to derive average volume estimates for existing old-growth stands.

The licensee defined fifteen analysis units, defined respectively for fir, cedar, hemlock-cedar, hemlock-balsam, and balsam, according to site classifications designated as "good", "medium" and "poor".

The licensee and BCFS Research Branch consider that site indexes for cedar-leading stands are likely underestimated, and the licensee plans to pursue the re-assignment of new site index values for the TFL prior to MP #3. Any such reassignment could affect regenerated volumes for the mid and long terms, but would not affect the validity of the estimates of old-growth volumes in existing stands on which this AAC determination for TFL 54 is based. I am satisfied that the analysis unit groupings used constitute a reasonable means for assessing average existing old-growth volumes.

- volume estimates for regenerated stands

Volume estimates in managed stands less than 41 years of age and all regenerated volumes were derived by the licensee from yield tables developed using the Table Interpolation Program for Stand Yields (TIPSY) and were accepted by BCFS Research Branch in January 1995. The volumes in these stands will not contribute to the timber harvest for many years, and were not used in generating the average volume per hectare for the TFL. Any potential uncertainty in these volumes will not affect the estimates of old-growth volumes per hectare used in this AAC determination.

- minimum harvestable ages

Minimum harvestable ages are estimates of the average time required for trees to reach a harvestable condition. In some AAC determinations changes in the age at which trees are harvested can affect the available timber volumes, even in the short term. However, with the interpretation of the Panel's

recommendations used for this determination, it is assumed that all trees harvested will be over 140 years. Thus there is no sensitivity in the estimates of average mature volumes per hectare to variations in minimum harvestable ages.

- *species profile of harvest*

All Douglas-fir leading stands in the timber harvesting land base are less than 41 years old, and on a number of these sites the planted trees are not growing optimally and could be suitable candidates for commercial thinning and replacement with understorey cedar or hemlock.

(ii) the expected time that it will take the forest to become re-established on the area following denudation;

- Regeneration delay

Regeneration delay

Regeneration delay is the elapsed time after harvesting before an area becomes occupied by a specified minimum number of acceptable, well-spaced trees. The Scientific Panel's recommendation R3.17 encourages the regeneration of naturally occurring species mixes. The licensee currently plans to continue planting the majority of harvested sites with ecologically suitable species within one year of harvest. The licensee's current performance in this respect is good.

The licensee notes that browsing by deer impedes regeneration on some cedar plantations and re-sloped roads, but applications of a natural repellent show early indications of effective discouragement. Sitka spruce weevil has been a concern, although less than five percent of trees planted in the TFL are Sitka spruce. BCFS district staff note that the licensee is dealing well with salal and salmonberry competition. The licensee currently plans to use mainly manual and mechanical brushing techniques, and despite the concerns noted, anticipates no problem in achieving an acceptable regeneration delay period and free-growing status for regenerated stands.

There appear to be no current reasons to anticipate conflict between regeneration practices in the TFL and the Panel's area-based harvesting requirements, and this factor has not affected my assessment of either the area expected to be available for harvest or the average timber volume per hectare.

o Not-satisfactorily-restocked area

Not-satisfactorily-restocked area

Licensee records indicate that TFL 54 contains a total of 537 hectares of not-satisfactorily-restocked (NSR) area. This figure is considered to represent current operations only, with no backlog areas identified. In the analysis, the NSR area in the timber harvesting land base was inadvertently omitted from the estimate of the area that is less than ten years old. This would indicate a slight overestimation of the harvestable area. However, as noted above under Existing forest inventory--*general comments*, I have assumed that this small overestimation is offset by the small underestimation associated with the need to update the inventory for growth.

District staff state that the NSR has accumulated due to specific problems in difficult sites which have since been overcome and are unlikely to reoccur, and the licensee expects to regenerate all the existing NSR within two years. NSR lands are thus not anticipated to become a source of difficulty with respect to the Panel's area-based harvesting requirements, and I have made no adjustment to the assessed harvestable area in this regard.

(iii) silvicultural treatments to be applied to the area;

- Silvicultural systems and treatments

Silvicultural systems and treatments

Under the Scientific Panel's recommendation for the use of variable retention silvicultural systems it is likely that the proportion of clearcuts in the TFL will be reduced from the recently applied maximum of 75 percent. In TFL 54 this will be facilitated to some degree by the licensee's considerable experience with helicopter logging.

Considerations related to spacing, fertilization, pruning and the genetic improvement of seed do not affect the assessment of either the harvestable area in the TFL or the volume of mature timber per hectare over the next five years, and thus have not influenced the area-based analysis used in the present AAC determination.

o Commercial thinning

Commercial thinning

The licensee is developing a proposal with Forest Renewal B.C. which includes consideration of opportunities for commercial thinning. BCFS district staff accept that limited potential for commercial thinning does exist in the TFL. However, before any assessment of the potential contribution of commercial thinning to the short-term timber supply may be evaluated, an appropriate program, consistent with the Panel's recommendation for variable retention silviculture, would need to be developed. The way in which areas harvested by commercial thinning relate to the Panel's rate-of-cut recommendations will also need to be clarified before consideration in an area-based analysis. Thus, for this AAC determination, in assessing the harvestable area in the TFL and the average volume per hectare, I have not been able to assume any contribution from commercial thinning.

(iv) the standard of timber utilization and the allowance for decay, waste and breakage expected to be applied with respect to timber harvesting on the area;

- Utilization and compliance

Utilization and compliance

The standard and level of timber utilization define the species, dimensions and quality of trees that must be cut and removed from the site during harvesting operations. For stands older than 140 years, current utilization standards require trees to be utilized to a minimum of 17.5 centimetres in diameter at breast height and to a minimum top diameter of 15 centimetres. Stump height must not exceed 30 centimetres. The average volumes per hectare estimated for TFL 54 were based on these standards.

o Decay, waste and breakage

Decay, waste and breakage

The estimates of existing timber volumes in stands greater than 140 years, from which the average volumes were derived for use with the BCFS area-based analysis, were based on direct measurements from field plots and included an allowance for volumes of wood lost to decay, waste and breakage. I am satisfied that for the purposes of this AAC determination, no further adjustment is required to the average volumes so derived.

(v) the constraints on the amount of timber produced from the area that reasonably can be expected by use of the area for purposes other than timber production;

- Integrated resource management (IRM) objectives
  - - visually sensitive areas
  - - water resources
  - - biological diversity
  - - riparian habitats

Integrated resource management (IRM) objectives

The Ministry of Forests is required by the *Ministry of Forests Act* to manage, protect and conserve the forest and range resources of the Crown and to plan the use of these resources to ensure production and harvesting of timber and the realization of fisheries, wildlife, water, outdoor recreation and other natural resource values are coordinated and integrated. Accordingly, the extent to which IRM objectives affect the timber supply must be considered in AAC determinations.

For Clayoquot Sound, the Scientific Panel has set forth comprehensive recommendations related to planning for sustainable ecosystem management, and as noted above, in "Guiding principles for AAC determinations for areas including portions of Clayoquot Sound", the Clayoquot Sound Central Region Board has been established as part of a joint management process between First Nations and provincial government appointees, to oversee development in Clayoquot sound, including implementation of the Clayoquot Sound Land Use Plan.

In this AAC determination, I have assumed that all planning will proceed in accordance with the Panel's recommendations, and that all timber harvested will be in accordance with plans developed on the basis of an analysis of resources in the area. I note that extensive work has been carried out in the identification and analysis of local resources, as reported for instance in the *Clayoquot Sound Sustainable Development Strategy* documents and in the licensee's resource inventories which have been accepted by the BCFS for visual landscapes, recreation, fisheries and operability. I have assumed that adequate provision for a range of identified resources and ecological processes will be attained through local planning and the use of the variable retention silviculture system.

In my assessment of the annually harvestable area in the TFL I have therefore made no further allowances for these objectives beyond those already incorporated in the analysis. In that regard, however, the following four factors require some further clarification.

- visually sensitive areas

With particular reference to visual quality considerations, I understand that a report by the Clayoquot Sound Scenic Corridors Committee has been submitted to the Central Region Board, and I anticipate that this will contribute to the local planning processes in accordance with the Panel's recommendations. I have assumed that visual quality objectives are accounted for in the application of the rate-of-cut constraints as applied in the BCFS analysis.

- *water resources*

Two community watersheds have been designated within the TFL, one on Meares Island, and one above Hot Springs Cove. As noted above, in *Meares Island*, Meares Island is excluded from the timber harvesting land base for this determination. One cutblock has been proposed, but not yet approved, for Hot Springs Cove. I have assumed that the one-percent harvest rate restriction applied in the analysis accounts adequately for management in the designated community watershed.

- *biological diversity*

Biological diversity, or biodiversity, is the full range of living organisms, in all their forms and levels of organization, and includes the diversity of genes, species and ecosystems, and the evolutionary and functional processes that link them. A major consideration in managing for biodiversity at the landscape level is leaving sufficient and appropriately located mature forests for species dependent on, or strongly associated with, old-growth forests. At the stand level, retention of wildlife tree patches and coarse woody debris are the major biodiversity concerns.

It is assumed in the BCFS area-based analysis for TFL 54 that the application of the Panel's one-percent-rate-of-cut restriction to the net operable land base, rather than to the gross area in each watershed, combined with the 40-percent-retained-old-growth requirement, will provide sufficient accounting for both stand- and landscape-level biodiversity. In this respect I note that in the analysis approximately 43 percent of the productive forest land base is excluded from consideration for harvesting even before these constraints are applied.

I have considered further that the analysis also accounts for a reasonable geographic distribution of the retained old-growth, since approximately 95 percent of all watersheds contain more than sufficient old-growth to meet the minimum requirement. That is, the requirement to retain 40-percent of each watershed in old growth limited the available timber supply in about five percent of the watersheds.

- *riparian habitats*

Issues related to riparian habitats are discussed under this title in Land base contributing to timber harvest.

> **(vi) any other information that, in his opinion, relates to the capability of the area to produce timber;**

Since 1989, with the exception of Bulson Creek, no access has been approved to undeveloped watersheds in Clayoquot Sound. It is anticipated in the BCFS area-based analysis that such watersheds will be accessed when the appropriate inventories and planning have been completed.

> **(b) the short and long term implications to the Province of alternative rates of timber harvesting from the area;**

- Implications of alternative rates of harvest
  - - difference between AAC and actual harvest (entire TFL)
  - - licensee's recent harvesting activity in Clayoquot Sound
  - - community dependence on forest industry

Implications of alternative rates of harvest

As noted in Application of the Scientific Panel's recommendations in timber supply analysis, the Scientific Panel's recommendation R3.1 could be interpreted as permitting the harvesting of one percent of the total area, of the productive forest area, or of the timber harvesting land base in each watershed. Each interpretation would result in a different rate of harvest: the total TFL area (without Meares Island and the new protected areas) is 45 384 hectares; the total productive forest is 41 049 hectares; and the estimated timber harvesting land base is 23 877 hectares.

For the reasons noted in the referenced section and in "Reasons for Decision", in the BCFS area-based analysis the one-percent annual harvest limit has been applied to the timber harvesting land base and I have considered that this best reflects the overall intent of the Panel's recommendations for the purpose of meeting my legislated obligation under section 7 of the *Forest Act*. As noted in the earlier section, the choice of applying the one-percent constraint to any alternative other than the timber harvesting land base would result in a harvest level greater than the current AAC for the TFL, which has not been met for a number of years (see table below), and in fact greater than that which would be expected under management prior to the Panel's recommendations. As discussed further in "Reasons for decision", I have considered these alternative interpretations to be inconsistent with the principles underlying the Panel's recommendations.

The BCFS area-based "base case" analysis resulted in a total rate of cut from all watersheds in the TFL of 125 hectares per year. Multiplying this figure by an average volume per hectare of 606 cubic metres for the timber harvesting land base resulted in an annually harvestable volume of 75 750 cubic metres.

For the reasons noted in this section and in the other sections referenced above, I have accepted the results of the BCFS area-based analysis as a suitable point of reference for my AAC determination. In the determination I have carefully examined whether any factor required to be considered under section 7 would necessitate an adjustment to the harvest level indicated by this analysis.

I have noted elsewhere that I expect that the location of harvests and the actual harvest level achieved will be determined through the development of area-based plans overseen by the Central Region Board.

As noted earlier, I have also been provided with an analysis by the licensee of the timber supply in the TFL (without Meares Island and protected areas) and under management prior to the Panel's recommendations, indicating a projected initial harvest level of 154 700 cubic metres; this has been useful in identifying the appropriate land base on which to apply the Panel's recommendations, as

discussed in "Reasons for Decision".

- difference between AAC and actual harvest (entire TFL)

(cubic metres per year)

year	AAC	chargeable cut	%
1992	180 000	174 692	97
1993	180 000	120 892	67
1994	138 000	82 472	60
1995	138 000	*100 114	72
1996*	138 000	**37 000	

- * It should be noted that some of the chargeable cut in 1995 is attributable to the yarding and scaling of wood felled in earlier years.

- ** Approximate to December 5, 1996.

- licensee's recent harvesting activity in Clayoquot Sound

The 125 hectares assessed in the BCFS analysis as annually harvestable in the TFL compare to figures for the total area harvested recently by the licensee in the Clayoquot Sound portion (93 percent) of the TFL as follows:

year	1993	1994	1995	1996 (6 mo)
area logged (hectares)	87.4	120.2	78.3	31

Doubling the 6-month figure for 1996 gives an average over the last four years of 87 hectares.

- community dependence on forest industry

The TFL is in close proximity to the communities of Tofino and Ucluelet and the First Nation villages of Hot Springs Cove, Ahousaht, Opitsaht, Esowista and Port Albion. Ucluelet is most dependent on the operations of TFL 54 since many of the workers and some support personnel live there. All harvesting operations on the TFL are contracted out, and all the licensee's sawmilling operations are on the mainland.

The licensee employs approximately 4000 people provincially, including 900 persons through logging contractors. Logging crews include workers from First Nations. A draft protocol agreement is being prepared, to define anticipated levels of participation by First Nations in timber harvesting activities in the TFL.

While I acknowledge the significance of the timber harvest from the TFL to local employment, in my determination I have given primary consideration to the particular social and economic objectives of the Crown for the Clayoquot Sound area as expressed by the Minister of Forests, with respect to government's intention to manage the Clayoquot area in accordance with the recommendations of the Scientific Panel, in recognition of the complex and unique circumstances surrounding the history of

development of forest management policy in Clayoquot Sound.

(c) the nature, production capabilities and timber requirements of established and proposed timber processing facilities;

- Timber processing facilities

Timber processing facilities

Timber harvested from TFL 54 is sent by log barge to various company sawmills — of which there are seven — in the lower mainland. Not all of the wood cut from the TFL goes directly to the licensee's mills; logs graded and sorted as pulp are sold or traded to other companies for sawlogs.

A small sawmill near Ucluelet (the Toquaht sawmill) was built in 1994 and is run by Toquaht Enterprises Limited. This mill utilizes low grade cedar logs, but very little wood from TFL 54 goes to this mill.

(d) the economic and social objectives of the Crown, as expressed by the minister, for the area, for the general region and for the Province;

- Social and economic objectives of the Crown
  - - local objectives

Social and economic objectives of the Crown

The Minister of Forests has expressed the social and economic objectives of the Crown for the *province* in two documents addressed to the chief forester: a letter dated July 28, 1994, (attached as Appendix 3) and a memorandum dated February 26, 1996, (attached as Appendix 4). The Minister has also expressed the social and economic objectives of the Crown for the *Clayoquot Sound area* in a letter to me as chief forester, dated September 17, 1996 (attached as Appendix 5). In my considerations for this AAC determination for TFL 54, I have been mindful of the information in each of these documents. However, in view of the more specific nature of the objectives for Clayoquot Sound as expressed in the Minister's most recent letter, I have placed more weight on these specific objectives than on the more general expressions for the province in the other two documents.

In particular, as noted elsewhere in this rationale document, in his recent memo the Minister has stated that government recognizes the complex and unique circumstances and history surrounding the development of forest management policy for the Clayoquot Sound, and has accepted the recommendations of the report of the Scientific Panel for Sustainable Forest Practices in Clayoquot Sound. The Minister confirmed government's intentions that timber harvesting continue to be one of the forest management objectives for the Clayoquot area and that management of the area be carried out in accordance with both the Forest Practices Code and the recommendations of the Scientific Panel. The Minister specifically expressed the Crown's intention that these objectives should be taken into consideration in AAC determinations for areas including Clayoquot Sound.

For this reason the methodology for obtaining a "base-case" analysis of the timber supply in TFL 54 has differed from that for all other management units in the province to date. Instead of a computer-generated, volume-based projection of timber supply over time based on data from a range of inputs, the base case analysis for this TFL was produced from an area-based, watershed-level interpretation of specific recommendations by the Scientific Panel, as discussed in Application of the Scientific Panel's recommendations in timber supply analysis and "Timber supply analysis base case". While the harvest level so obtained is not a representation of the result of a complete modelling of all the Panel's recommendations — which would not be possible in the current absence of operational experience — the result does more closely represent forest management in accordance with the Panel's recommendations than would a conventional, volume-based analysis. In this way I have attempted to reflect as fully as currently possible government's objective regarding the Panel's recommendations.

The objectives of the Crown expressed for the province in the other two documents are consistent with the objectives stated in the Forest Renewal Plan and refer to forest stewardship, a stable timber supply, and allowance of time for communities to adjust to harvest level changes in a managed transition from old-growth to second-growth forests so as to provide for continuity of employment. They also include

the statement that "any decreases in allowable cut at this time should be no larger than are necessary to avoid compromising long-run sustainability". The Minister also placed particular emphasis on the importance of long-term community stability and the continued availability of forest jobs. To this end he asked that the chief forester consider the potential impacts on timber supply of commercial thinning and harvesting in previously uneconomical areas. The latter would likely require the use of alternative harvesting systems, and to encourage this the Minister suggested consideration of partitioned AACs.

As discussed above, under commercial thinning, the licensee is developing a proposal with Forest Renewal B.C. which includes consideration of opportunities for commercial thinning. In advance of the completion of this proposal, I have not assumed any changes to the timber supply from commercial thinning. The utilization of any such supply will need to be developed in accordance with the Panel's recommendations and approved by the Central Region Board.

With regard to harvesting in previously uneconomical areas, I note that the planning of all harvesting in the TFL will be overseen by the Central Region Board, consistent with the Panel's recommendations. Therefore, while I note that the licensee has identified some marginally operable areas and areas operable by helicopter, and that these have been included in the timber harvesting land base for the BCFS area-based analysis, I have made no further provision in this regard in this determination.

The Minister's memorandum addressed the effects of visual resource management on timber supply, and asked that the pre-Code constraints that were applied to timber supply in order to meet VQOs be re-examined when determining AACs in order to ensure they do not unreasonably restrict timber supply when considered in conjunction with other Code requirements. Again, all planning, including visually sensitive areas, will be overseen by the Central Region Board, which I understand has recently received a report from the Clayoquot Sound Scenic Corridors Committee, as noted above, in *visually sensitive areas*.

- local objectives

Both the Minister's letter and memorandum encouraged the chief forester to consider important local social and economic objectives that may be derived from the public input. In the case of TFL 54, I note the long history of public participation in local planning processes which preceded government's 1993 Clayoquot Sound Land Use Decision, and the now ongoing public representation in planning through the Central Region Board.

Specifically for TFL 54, during the public review of the statement of management objectives, options and procedures, 45 people attended open houses and four group presentations were made, but there were no written responses. During the review of MP No. 2 five open houses were held with 32 attendees, resulting in five written responses. Six presentations were also made by the licensee to various groups. The most common responses were concern over the future of employment in the area and over the need for, and progress in, sustainable management. These are issues which are expected to be addressed under the ongoing work of the Central Region Board.

(e) abnormal infestations in and devastations of, and major salvage programs planned for, timber on the area.

- Non-recoverable losses (NRLs)

Non-recoverable losses (NRLs)

The licensee's analysis assumed 0.1 cubic metres per hectare per year as an estimate of the non-recoverable volume loss, based on the 1992 AAC rationale for MP #1. On this basis the total unsalvaged losses for TFL 54 would be 2388 cubic metres annually. For the purposes of the BCFS area-based analysis, it is assumed that the volume attributable to NRLs would be 0.1 (cubic metres per hectare per year) x 125 (hectares harvested annually) = 12.5 cubic metres per year. In context of other uncertainties I have not adjusted the base case for this small amount.

Windthrow is a natural occurrence and is evident throughout TFL 54 on an ongoing basis. In the nearby Arrowsmith TSA, NRLs of 2000 cubic metres per year were applied for wind damage, on a timber harvesting land base of 75 244 hectares. The licensee for TFL 54 expects to have to design cutblocks to minimize the potential for windthrow.

Fire losses of 1062 cubic metres per year were reported for the Arrowsmith TSA, but very few fires have been recorded in the history of TFL 54.

Dwarf mistletoe has always existed in mature hemlock stands within the TFL at a moderate level, and its effects on stand growth are accounted for in the current average volume lines for the TFL.

It is conceivable that the application of an adjustment for non-recoverable losses could slightly reduce the harvest level indicated in the BCFS area-based analysis. However, in the broad scale of uncertainties associated with implementation of the Scientific Panel's recommendations, in my determination I have made no adjustment on this account to the results of the analysis.

Reasons for decision

In reaching my decision on an AAC for TFL 54, I have considered all the factors presented above and have reasoned as follows.

The location of 93 percent of the area of TFL 54 within the area covered by the provincial government's April 1993 Clayoquot Sound Land Use Decision has been the factor of primary importance in determining a harvest level for the TFL. The provincial government's July 6, 1995 acceptance of, and commitment to fully implement, the Scientific Panel's recommendations for sustainable forest management in Clayoquot Sound, were subsequently confirmed to me in the Minister of Forests' letter of September 17, 1996, as a formal expression of social and economic objectives of the Crown. Given this clear expression of the Crown's objectives, I have placed significant weight in my determination on the Crown's stated objective that the Clayoquot area be managed according to the recommendations of the Scientific Panel.

As a direct result, the methodology I have adopted in this determination is fundamentally different from that applied in AAC determinations for all other management units in the province outside the Clayoquot area. While I have considered in detail all those factors required by section 7 of the *Forest Act* to be considered, I have not done so by testing the current validity of a computer-generated timber supply projected over a period of hundreds of years, as is the conventional approach to AAC determinations in this province. Rather, I have used a methodology for examining timber supply which is as consistent as possible, given currently available information, with specific recommendations of the Panel which bear a direct relationship with the amount of timber that may be harvested from watershed areas within Clayoquot Sound.

In employing this methodology, I have attempted to reconcile the provincially legislated requirement to determine an AAC for TFL 54 under section 7 of the *Forest Act* with government's expressed intention to implement the Scientific Panel's recommendations for the area, given that these include the recommendation to "determine the anticipated annual volumes of timber to be cut for watershed planning units", "*after* analysis of resources and development of area-based plans"(from recommendation R7.10).

I acknowledge from the outset that this determination is being made *before*, rather than after, completion of local planning for the area, expressly in order to meet the requirements of section 7. For that reason I have noted in my considerations that the AAC I determine is intended to provide an indication of the maximum harvest level that might be attained in accordance with my interpretation of certain of the Panel's recommendations, understanding that the actual harvest level achieved in the area will result from due planning processes overseen by the Central Region Board.

As noted in Application of the Scientific Panel's recommendations in timber supply analysis and "Timber supply analysis base case", the BCFS area-based analysis of the harvestable area in the TFL by

watershed was based on an application of the harvesting restrictions prescribed in the Panel's recommendations. I noted there that it would have been possible to interpret these restrictions as applying to the gross area in each watershed, the productive forest in each watershed, or the net operable timber harvesting land base in each watershed. As discussed in Alternative rates of harvest, the application of the restrictions to either of the first two of these alternative land bases would result in a higher harvest level than the currently reduced AAC of 138 000 cubic metres. In fact, the lower of these two alternative levels, obtained by applying the one-percent-rate-of-cut restrictions to the total productive forest in each watershed, indicated an annually harvestable volume of 170 000 cubic metres. This causes me concern for the following reasons.

As noted under "The conventional role of the base case in AAC determinations", the licensee provided an analysis of the timber supply *under the management regime that was in effect before the Panel's recommendations were published*. In that section, I noted that this analysis included an examination of the timber supply in the TFL assuming no contribution from Meares Island or from the areas that were newly protected under the Clayoquot Sound Land Use Decision (scenario 3). This analysis, assuming pre-Panel management, indicated an initially available timber supply of 154 700 cubic metres per year. This figure is lower than the 170 000 cubic metres obtained when considering the total productive forest area instead of the timber harvesting land base in each watershed.

I believe that the Panel's recommendations are likely to result in a more constrained, rather than increased, timber supply — particularly in view of hydroriparian harvesting restrictions in the general IRM zone. The Panel itself has noted (*Report 5*, page 62) that its recommendations will result in a lower sustainable timber supply than historical levels. If the BCFS watershed-based analysis, based on the same area as in the licensee's analysis (i.e. with no contribution from Meares Island or protected areas), were to result in a projected harvest level higher than the licensee's conventional timber supply forecast, it would be unreasonable to expect that such a result could be consistent with the intention of the Panel's recommendations.

The application of the one-percent restriction to the gross area of each watershed would result in an even higher harvest level than 170 000 cubic metres. Moreover, as noted in Application of the Scientific Panel's recommendations in timber supply analysis, the application of the Panel's recommendations to either suggested land base other than the timber harvesting land base would result in an intensity of harvesting activity in Clayoquot Sound higher than historic harvest levels. For these reasons I have concluded that the only reasonable assumption I can make is to apply my interpretation of the Panel's recommendations regarding rate of cut to the timber harvesting land base, as was done in the BCFS watershed-based analysis.

I have carefully examined the methodology employed in the BCFS area-based analysis as described in "Timber supply analysis base case projection", and I consider this to be a reasonable means of deriving the annually harvestable area and the average volume per hectare.

With respect to the accuracy of the figure applied in the BCFS analysis for the estimated average volume per hectare in old-growth stands, I note that the first phase of a new vegetation inventory for the TFL is already underway, following completion of which the second phase will begin immediately. Any required adjustment to the volumes used as a basis for deriving the average volume used in the analysis can be made on completion of this inventory, and if required, a suitable revision to the AAC determined.

From all the foregoing considerations and reasoning, I conclude that the BCFS area-based, watershed-level analysis provides a reasonable indication of the volume of timber that may be expected to be harvested from TFL 54 under the described interpretation of the Panel's recommendations. My considerations have identified no reason to vary the results of the analysis, and I therefore find the

resulting annual volume of 75 750 cubic metres to be a suitable AAC for TFL 54 at this time.

Determination

It is my determination that effective December 30, 1996, the new AAC for TFL 54 will be 75 750 cubic metres. This represents a decrease of 58 percent from the AAC of 180 000 cubic metres that was in effect before the Clayoquot Sound Land use decision, or 45 percent from the current AAC of 138 000 cubic metres which includes the Part 15 reduction. This new AAC will remain in effect until a subsequent AAC is determined, which must take place within five years of this determination. This AAC should not be construed as an input to local planning processes overseen by the Central region Board, which are intended to identify the specific areas for harvest on which the actual harvest level achieved will depend.

Having now determined a new AAC for TFL 54 under section 7 of the *Forest Act* which has excluded the designated protected areas and has accounted in a general way for new management practices in Clayoquot Sound, I have also made a new order, effective December 30, 1996, repealing the temporary AAC reduction previously ordered for TFL 54 under Part 15, related to Orders-in-Council Nos. 718 and 719.

Implementation of Decision

During the term of this current management plan, the licensee should continue to work closely with Port Alberni Forest District staff and with the Central Region Board to ensure that all timber harvesting in the Clayoquot Sound area is a result of, and conforms to, appropriate local planning and forest practices as recommended by the Scientific Panel.

Larry Pedersen
Chief Forester
December 18, 1996

Appendix 1:

Section 7 of the *Forest Act*

Appendix 2:

Section 4 of the Ministry of Forests Act

Appendix 3:

Letter from Minister of Forests, July 28, 1994, to Chief Forester, re social and economic objectives of the Crown.

Appendix 4:

Memo from Minister of Forests, February 26, 1996, to Chief Forester, re social and economic objectives of the Crown—visual resources.

Appendix 5:

Memo from Minister of Forests, September 17, 1996, to Chief Forester, re social and economic objectives of the Crown for Clayoquot Sound.